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Amphiphilic cyclodextrins (ACDs) have been studied and utilised in many different applications, as ACDs have the possibility to form micelles, liposomes and inclusion complexes with hydrophobic substances [1]. In the pharmaceutical area, the ACDs are used e.g. carrier systems for lipophilic drugs, to enhance bioavailability, solubility and stability [2].

In this work, primary face butyrate modified β-CDs (C47) [3] were used to incapsulate lutein in water soluble nanoparticles. Lutein is a hydrophobic molecule acting as a strong dye when solubilised in proper solvent and is commonly used in pharmaceutical, nutraceutical and food industries. The characteristic absorption peaks of lutein are measured to be at 430, 455 and 484 nm in dichlormethane. These characteristics make lutein an excellent test-molecule for evaluation of the incapsulation properties of the ACDs. The incapsulation of lutein was measured using UV-Vis spectroscopy and DLS for size determination of the nanoparticles.

The lutein:C47 incapsulation was examined at different ratios and the mixture was prepared using a nanoemulsion method [2]. In all series, the concentration of lutein in water was 10 μM and the concentration of C47 varied from 10 μM to 100 μM. The size of the particles, measured with DLS, ranged from 150 nm up to 500 nm and even larger aggregates, which settled at the bottom of the vial. The UV-Vis spectra of the lutein:C47 complexes showed both scattering of all wavelength from the particles, but also the characteristic peaks of solubilised lutein. This indicates that the lutein was incapsulated in an ACD-hydrophobic environment by maintaining the spectroscopic properties of lutein dissolved in organic solvent. Furthermore the complexes appeared stable over several days with only a slight decrease in absorption. The lower rim of the ACDs is still available to graft molecules relevant for e.g. targeting, prompt to recognise receptor protein on the surface of the nanoparticle.

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